Indoor Radon Monitoring and Gamma Activity Levels Inside Some Ancient Egyptian Tombs in Luxor

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Abstract

In the present work, radon concentrations in five selected tombs in the valley of kings, Luxor city, have been evaluated utilizing a portable radon monitor RTM 1688-2, SARAD. Additionally, specific radioactivity concentrations of the radionuclides 226Ra, 232Th and 40K in the samples taken from the selected tombs showing results lower than the average international radioactivity levels. Seasonal variations of radon concentration have been observed, with high summer average radon concentration values at the tomb of RAMESES II SONS (KV 5) of about 6365 Ñ 190 Bq.m-3for the tombôs inner chamber and 5511 Ñ 276 Bq.m-3for the tombôs middle chamber. The highest winter average radon concentration was observed at RAMESES VI tomb (KV9) with a value of 491 Ñ 16 Bq.m-3. The tour guides are found to expose to an average associated annual effective doses ranging from 0.360 to 14.592 mSv.y-1and the visitors from 0.001 to 0.029 mSv.y-1while the corresponding results for workers ranging from 3.455 to 140.081 mSv.y-1 which exceed the world lower recommended level (3-10 mSv.y-1). Accordingly, to avoid the health hazards associated with the exposure to radon during the long period of work inside these tombs, proposed solutions are introduced.

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